Prophylactic cranial irradiation (PCI) in non small cell lung cancer (NSCLC)

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Introduction. The NSCLC stage III, represents a third of cases. Combined Schemes of multimodal therapy, rates obtained of locoregional control are 40–50%. The brain is one of the causes of distant failure. Preliminary studies have shown the efficacy of PCI in reducing the risk of CNS metastases as a first failure. PROPOSAL: A pilot study phase II about PCI in stage III NSCLC with unfavorable histology, which have obtained clinical or pathological complete response after combined multimodal therapy. OBJECTIVES: To assess the rate of cerebral recurrence. Assess the late toxicity in long survivors, and analyze the impact of PCI on overall survival.
Patients and methods. Patients with stage III NSCLC, with unfavorable histology, which have been treated with RT/CT with/without surgery after clinical or pathological CR. Treatment plan: - PCI starts after thoracic surgery or after thoracic radiation and chemotherapy has finished and response has been assessed. The treatment is administered within 13 weeks from the primary treatment. – Cranial RT – Dose: 30 Gy/2 Gy/day/three weeks. A total of 28 patients have been enrolled between July 2004 and December 2012. Age: 61 (34-75), Gender: M (25%)/H (75%), Histology: Adenocarcinoma 13/28 (44%). Squamous G3 14/27 (51%), large cell undifferentiated carcinoma 1/27 (3.5%). Stage: IIIA: 16/27 (59%), IIIB: 11/27 (41%). A total of 6 patients refused PCI treatment and were analyzed for cerebral recurrence rate.
Results. Follow-up: 51 months. Survival: 14/28, (50%). Progression: SNC: 1/28 (3.58%). 96% Control (PCI Rejects: 2/6 (33%)). Chronic neurological toxicity: (1 pt. Hydrocephalus).
Conclusions. The PCI is a safe and effective technique in controlling CNS metastases in patients with advanced disease. The CNS-level control is 96%. Randomized studies are necessary to establish the definitive role of the PCI in the treatment of advanced NSCLC and unfavorable histology.

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Thoracic radiotherapy in small cell lung carcinoma with extensive disease

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Introduction. SCLC accounts for 20% of all lung cancers. At diagnosis, 60% are extensive disease outside the chest. Overall survival is ranging from six to 12 months, with overall responses between 70 and 85% with chemotherapy. 60% have loco-regional recurrence after response to chemotherapy.
Proposal. To analyze the value of consolidation thoracic radiotherapy (RTCT) and prophylactic cranial irradiation (PCI) in SCLC patients with extensive disease.
Objectives. To improve loco-regional control rate. Increase the progression-free interval. Maintain acceptable acute and chronic toxicity. Assess the impact on overall survival.
Patients and methods. RTCT similar in disease limited to the chest, PCI with similar characteristics. Palliative cranial irradiation: will be used next to 30 Gy/10 fractions. We present a series which includes 37 patients between 2004 and 2012: Age: median 63 years (39–80). Sex: female (4)/man (33). Initial location of metastases: pleural (3), lung (2), esophagus (1), cervical-supraclavicular (9 patients), bone (12), liver (6), pelvis (1), adrenal (5), retro-peritoneum (3), central nervous system (3), axilla (2), small bowel (1).
Results. Responses 37/37 patients. RCC: 15/37 (40.5%), RPC: 22/37 (59.5%). Median follow-up: 48 months. Median survival: 15 months. Progression-free interval: 10.5 months. Alive: 10/37 (27%). VSE: 8, VCE: 2. 7/37 live more than 36 months, 4/37 live more than 24 months (long survivors). Exitus, 27/37 (73%). Disease progression by location (27/37): SNC 7/37 (19.5%): 5/6 no IPC (83%), 2/31 IPC (6.5%). Lung: 8/37 (21.6%), supraclavicular: 2/37 (5.4%), bone: 5/37 (13.5%), cervical: 1/30 (3.2%), liver: 7/37 (19.5%), adrenal: 5/37 (13.5%). There have been two events of pulmonary toxicity.
Conclusions. RTCT and PCI, is a safe and effective technique. The overall survival results are similar to the few publications in the literature. The control rate chest disease was 70%, the rate in the CNS control was 93% with PCI. Pulmonary toxicity was low but serious.

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Treatment-related acute esophagitis for patients with locoregionally advanced non-small cell lung cancer

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Introduction. Acute esophagitis is a very common complication of radiotherapy in thoracic malignancies and may be a dose-limiting toxicity. The use of both concomitant chemotherapy and elective nodal irradiation seems to increase the incidence and severity of this toxicity. Objective. To evaluate the incidence and clinical/dosimetric risk factors for treatment-related acute esophagitis in patients with non-small cell lung cancer (NSCLC) treated with radiotherapy.

Method. Between 2009 and 2012, 110 patients with localized NSCLC had radical 3-dimensional conformal radiotherapy (3D-CRT). 63% of patients received concomitant chemotherapy. The acute toxicity was evaluated retrospectively according to Common Terminology Criteria Adverse Events V3.0. Analysis was conducted for the maximum
Results. 6% of patients developed acute grade 3 esophagitis. 34% of patients developed acute grade 2 esophagitis. No grade 3 or 4 acute esophagitis was seen in patients without concomitant chemotherapy or with involved field irradiation. On univariate analysis acute grade 2 and 3 esophagitis was higher in patient with concomitant chemotherapy ($p < 0.05$). Severe acute esophagitis was lower in patient with involved field irradiation (IFI) ($p < 0.05$).
Conclusions. Higher risk of grade ≥2 treatment-related esophagitis was associated with use of concomitant chemotherapy and with lower total esophageal volume dose. IFI decreases sever acute esophagitis in patients with NSCLC.

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Underuse of radiotherapy in lung cancer negatively impacts survival

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Introduction. Lung cancer is the first cause of death due to cancer in males and the third in females. RT alone or with others therapies has proven to be an effective treatment. However, underuse of radiotherapy has been observed in various studies. Objective: To assess the use of radiotherapy as initial treatment for lung cancer in Andalusia, a southern region of Europe.
Methods. A systematic review of the literature and clinical practice guidelines for lung cancer was performed to estimate expected radiation rates and the benefit from this treatment. We then collected data from the clinical and treatment records of all patients undergoing radiotherapy for lung cancer during 2007 in all the 12 public hospitals in Andalusia which possessed RT Services.
Results. In 2007, it was estimated 3051 incident cases of lung cancer, but only 610 patients underwent initial radiotherapy for lung cancer. Thus, the overall radiation rate was 20%, and significantly differed among provinces (range, 8.5–25.6%, $p < 0.001$). According to the expected radiation rate (1383 patients), 773 more patients of lung cancer (25%) should have been treated. The maximum increased survival attributable to the use of radiotherapy in patients with non–small-cell lung cancer ranges from 1.8 to 14.1 months, depending on the reviewed article. In this way, the underuse estimated in the region would correspond to a loss of more than 3000 months in survival time.
Conclusions. The observed underuse has an important negative impact on patients measured in the months of survival.

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Upper lung movement study. Radiosurgery applicability without stereotactic frame

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Introduction. The use of 4D-CT has introduced the possibility of measuring internal movements in lung treatments. Our objective is to determine what are these movements for a group of 10 patients, not necessarily with lung cancer, and determine which anatomical area has displacements less than 5 mm, so that they are suitable to be located with megavoltage CBCT, and be treated without tracking or gating techniques nor any breath holding devices.
Methods. We used a Siemens Somaton Sensation Open Bore CT, with pressure belt-based respiratory phase acquisition device (Anzai). For each patient a 4D acquisition along the entire length of the thorax was acquired. 10 phases were reconstructed (5 inspiration/5 exhalation) and transferred to a 4D analysis workstation (InSpace, Siemens), where the bronchial movements were measured in cartesian directions.
Results. Result show that there is a motility that depends on the distance of the bronchus from the lung apex and the diaphragm. For our population, in the upper third of the lung at 4 cm from apex the maximum movement was less than 5 mm (3 mm average). At 7 cm the maximum movement was less than 10 mm (6 mm average). On the other hand, near diaphragm (20 cm from apex) maximum elongation was 36 mm (18 mm average).
Conclusions. Upper lung lobe treatment delivery can be performed with proper daily CBCT localization techniques. Tracking or gating techniques thus can be ignored for lesions located near apex and with use of conventional 3D margins. Nevertheless, 4D individual patient study is required and yet caution must be taken about the eventual migration of the lesion from reference CT position.

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